CONTRIBUTIONS TO NMFS ANNUAL REPORT

Increased fishing effort expended on the South Pacific albacore, Thunnus alalunga, in the past 10 years has resulted in a decline of over 60% in apparent abundance. Preliminary CPUE estimates for early 1974 are alarmingly low. A further increase in harvesting pressure is proposed. SWFC HL, therefore, has undertaken an assessment of this fishery. Results show that the maximum sustainable "average" yield is estimated to be 33,000-35,000 MT. Based on the generalized production model of Pella and Tomlinson, a 25% increase in fishing effort over the 1971 level could result in a moderate catch increase of 300 MT or a decline of 6,700 MT, depending on the measure of fishing effort used.

The HL, in a search for ways to augment the often-inadequate supply of baitfish used in pole-and-line skipjack tuna fishing in the central and western Pacific Ocean, experimented with transporting the northern anchovy, Engraulis mordax, from California to Hawaii. Holding tanks for acclimatizing the anchovy prior to shipping were set up at the site of the bait supply. Bait density and survival experiments were completed. With various degrees of success several loads of anchovy were carried to Hawaii in a 5,000-gallon baitfish transport tank, constructed from a surplus aircraft fuel transport trailer. At least two more trial shipments, carrying the recently determined optimum capacity of 0.34 pound per gallon, should result in a cost-effective survival rate of 70%.

In a major breakthrough, HL scientists have demonstrated the existence of three fundamental limits defining the extremes of the skipjack tuna habitat. First, these highly active animals require an abundance of oxygen; they cannot live for more than a few minutes in water of less than 3.5 ml/liter oxygen. Second, a lower temperature limit near 16°-18°C places a maximum limit on their depth distribution in higher latitudes wherever dissolved oxygen is not a factor. Third, an upper temperature limit is established by internal muscle temperatures generated by the animals' metabolism. The protein in the fish's muscle suffers irreversible damage at temperatures higher than about 35°C, so that the smallest (1 kg) fish must remain in water cooler than 30°; the largest (13 kg) in water cooler than 20°C.

[transmitted via telecopier to L. Vlymen, 1/10/75, 1200.]

Publications for calendar year 1974

DIZON, A. E., E. D. STEVENS, W. H. NEILL, and J. J. MAGNUSON.
1974. Sensitivity of restrained skipjack tuna (Katsuwonus pelamis) to abrupt increases in temperature. Comp. Biochem. Physiol. 49A:291-299.

HESTER, F. J.
1974. Some considerations of the problems associated with the use of live bait for catching tunas in the tropical Pacific Ocean. U.S. Natl. Mar. Fish. Serv., Mar. Fish. Rev. 36(5):1-12. (MFR Paper 1060.)

HESTER, F. J., and E. C. JONES.
1974. A survey of giant clams, Tridacnidae, on Helen Reef, a western Pacific atoll. U.S. Natl. Mar. Fish. Serv., Mar. Fish. Rev. 36(7):17-22. (MFR Paper 1071.)

IVERSEN, R. T. B., and R. R. KELLEY.
1974. Occurrence, morphology, and parasitism of gastric ulcers in blue marlin, Makaira nigricans and black marlin, Makaira indica, from Hawaii. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 149-153.

MATSUMOTO, W. M.
1974. The skipjack tuna, Katsuwonus pelamis, an underutilized resource. U.S. Natl. Mar. Fish. Serv., Mar. Fish. Rev. 36(8):26-33. (MFR Paper 1077.)

National Marine Fisheries Service
Southwest Fisheries Center
Honolulu Laboratory
Honolulu, Hawaii 96812

MATSUMOTO, W. M., and T. K. KAZAMA.
1974. Occurrence of young billfishes in the central Pacific Ocean. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 238-251.

NEILL, W. H., and E. D. STEVENS.
1974. Thermal inertia versus thermoregulation in "warm" turtles and tunas. Science (Wash., D.C.) 184:1008-1010.

OTSU, T.
1974. A report from the National Marine Fisheries Service, Southwest Fisheries Center, Honolulu Laboratory (Honolulu Suisan Kenkyusho no kenkyu katsudo—toku ni katsuo gyogyō kaihatsu shiken—ni tsuite). [In Japanese.] Proceedings, 1973 Tuna Research Conference, Shimizu, Japan, February 7-9, 1974. Fisheries Agency, Far Seas Fisheries Research Laboratory, p. 277-280.

SHOMURA, R. S., and W. L. CRAIG.
1974. Mercury in several species of billfishes taken off Hawaii and southern California. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 160-163.

SHOMURA, R. S., and F. WILLIAMS (editors).
1974. Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, 335 p.

National Marine Fisheries Service
Southwest Fisheries Center
Honolulu Laboratory
Honolulu, Hawaii 96812

SKILLMAN, R. A., and M. Y. Y. YONG.
1974. Length-weight relationships for six species of billfishes in the central Pacific Ocean. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 126-137.

STRUHSAKER, P., and D. C. AASTED.
1974. Deepwater shrimp trapping in the Hawaiian Islands. U.S. Natl. Mar. Fish. Serv., Mar. Fish. Rev. 36(10):24-30. (MFR Paper 1095.)

STRUHSAKER, P., and R. M. MONCRIEF.
1974. Bothus thompsoni (Fowler) 1923, a valid species of flatfish (Pisces: Bothidae) from the Hawaiian Islands. Fish. Bull., U.S. 72:237-246.

UCHIYAMA, J. H., and R. S. SHOMURA.
1974. Maturation and fecundity of swordfish, Xiphias gladius, from Hawaiian waters. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 142-148.

YOSHIDA, H. O.
1974. Landings of billfishes in the Hawaiian longline fishery. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 297-301.

YUEN, H. S. H., A. E. DIZON, and J. H. UCHIYAMA.
1974. Notes on the tracking of the Pacific blue marlin, Makaira nigricans. In R. S. Shomura and F. Williams (editors). Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, 9-12 August 1972, Part 2. Review and Contributed Papers. U.S. Dep. Commer., Natl. Mar. Fish. Serv., Spec. Sci. Rep. Fish. 675, p. 265-268.

National Marine Fisheries Service
Southwest Fisheries Center
Honolulu Laboratory
Honolulu, Hawaii 96812

FEDERATION OF JAPAN TUNA FISHERIES CO-OPERATIVE ASSOCIATIONS AND JAPAN TUNA FISHERIES FEDERATION.
1972. Study of bait problems in the skipjack tuna and tuna fisheries (Katsuo-maguro gyogyo no jiryo taisaku). Federation of Japan Tuna Fisheries Co-operative Associations and Japan Tuna Fisheries Federation (Katsuo to Maguro) 126:4-8. February 1972. (Engl. transl., 1974, 6 p.; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

HORIKAWA, A.
1974. Japan's tuna production (Waga kuni no maguro gyogyo seisan). Suisan Shūhō (The Fishing and Food Industry Weekly) 707:16-19. March 25, 1974. Suisansha K.K. (Engl. transl., 1974, 7 p., Transl. No. 4; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

KATSUO-MAGURO NENKAN.
1973. Japanese skipjack tuna fishery development in foreign areas (Katsuo kaihatsu--kaigai katsuo-zuri gyogyo). Katsuo-Maguro Nenkan (Skipjack-Tuna Yearbook). Suisan Shinchōsa K.K. Tokyo, p. 151-158. (Engl. transl., 1974, 12 p., Transl. No. 5; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

KIKAWA, S.
1971. Shunyo Maru's third bait survey in the Papua New Guinea area (Shunyo Maru ni yoru dai-san-ji Papua New Guinea jiryogyo chosa). Proceedings of the 1970 Japanese Tuna Fishery Research Conference, Shimizu, Japan, February 3-5, 1971, p. 255-262. Fisheries Agency of Japan, Far Seas Fisheries Research Laboratory. (Engl. transl., 1974, 10 p., Transl. No. 2; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

KINKI UNIVERSITY FISHERY EXPERIMENTAL STATION.
1974. Artificial fertilization and rearing experiments conducted on tunas in 1973...A progress report (Showa 48-nendo maguro-rui fuka shi-iku gijutsu kaizen shiken hōkoku-sho). Preliminary progress report prepared for a special meeting of cooperating agencies working on tuna culture research, Shimizu, Japan, February 26, 1974, 23 p. (Mimeogr.) (Engl. transl., 1974, 18 p., Transl. No. 3; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

SAITO, S., and S. SASAKI.
1974. Swimming depth of large sized albacore in the South Pacific Ocean--II. Vertical distribution of albacore catch by an improved vertical long-line. Bull. Jap. Soc. Sci. Fish. 40:643-649. (Engl. transl., 1974, 12 p., Transl. No. 9; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

SHIOHAMA, T.
1974. Yearly variations in catches and sizes of albacore in the Japanese pole-and-line fishery (Saozuri binnaga no gyokakuryo to taicho sosei no keinen henka). Background paper from Proceedings of the 1973 Japanese Tuna Fishery Research Conference, Shimizu, Japan, February 7-9, 1974, p. 273-276. Fisheries Agency of Japan, Far Seas Fisheries Research Laboratory. (Engl. transl., 1974, 5 p., Transl. No. 8; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

SUISAN SEKAI.
1973. This year's saury (Cololabis saira) landings result in both joy and sorrow (Hiki komogomo kotoshi no sanma ryo). Suisan Sekai 22(11):32-43. (Engl. transl. of selected highlights, 1974, 11 p., Transl. No. 1; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

TOHOKU REGIONAL FISHERIES RESEARCH LABORATORY.
n.d. Atlas of skipjack tuna fishing grounds in southern waters, 1973 fishing season (July 1973-May 1974) (Showa 48 nendo nanpō katsuo gyokyō). [Five pages text, 14 charts.] (Engl. transl., 1974, 22 p., Transl. No. 7; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

URABE, S. (interviewer).
1974. There's a keen interest in developing new skipjack tuna fishing grounds (Shingyojo no kaihatsu ni iyoku wo moyasu). Suisan Sekai 23(1):84-93. [Interview with two brothers, both fishing masters on vessels belonging to the Abekane Suisan K.K.] (Engl. transl. of selected portions of article, 1974, 17 p., Transl. No. 6; available Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

National Marine Fisheries Service
Southwest Fisheries Center
Honolulu Laboratory

NEILL, W. H., and JR J. MAGNUSON.
1974. Distributional ecology and behavioral thermoregulation of fishes in relation to heated effluent from a power plant at Lake Monona, Wisconsin. Trans. Am. Fish. Soc. 103:663-710.

National Marine Fisheries Service
Southwest Fisheries Center
Honolulu Laboratory
Honolulu, Hawaii 96812